

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2005/001127

International filing date (day/month/year)
04.02.2005

Priority date (day/month/year)
20.02.2004

International Patent Classification (IPC) or both national classification and IPC
INV. C25C1/12 C25C7/02

Applicant
OUTOKUMPU OYJ

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☒ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☐ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☒ all parts.
 - ☐ the parts relating to claims Nos.

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|-------------|
| Novelty (N) | Yes: Claims | 1-15, 27-30 |
| | No: Claims | 23-26 |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | 1-15, 23-30 |
| Industrial applicability (IA) | Yes: Claims | 1-15, 23-30 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item IV.

1. The International Authority considers that there are **three inventions** covered by the claims.

1.1 The reasons for which the inventions are not so linked to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows :

The single general concept is the subject-matters of claims 1-5. This concept is not inventive (Art. 33(3) PCT), for the following reason :

1.1.1 The document D1 (Patent DE 199 40 698) is regarded as being the closest prior art to the subject-matter of **claim 1**, and discloses (the references in parentheses applying to this document):

A process for copper electrowinning from an electrolyte solution containing the metal in ionogenic form (col. 1, l. 5-7), in which the electrolyte is passed through an electrolysis cell which, in an electrolyte tank for receiving the electrolyte has several electrodes, alternatively arranged anodes and cathodes (col. 2, l. 32-33).

The subject-matter of claim 1 therefore differs from this known electrowinning process in that:

The cathodes are immersed into the electrolyte over a length of at least 1.2 meters, whereas usually, this length is up to 1 meter. As an effect, the amount of copper deposited on the cathode in one deposition cycle is higher than the amount of copper deposited on a cathode of 1 meter length immersion.

The problem to be solved by the present invention may therefore be regarded as increasing the efficiency of the process.

The solution proposed in claim 1 of the present application cannot be considered as involving

an inventive step (Article 33(3) PCT) for the following reasons.

The increase of the deposition surface is merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed, since there does not seem to be any objection in the available prior-art to limit the length of the immersed cathode specifically to 1 meter.

1.1.2. Samely, increasing this length to 2 meters, or increasing the number of cathodes does not seem to involve an inventive step. A current density of 200A/m^2 is a normal option, that the person skilled in the art would consider in such a process without the exercise of inventive skill.

In conclusion, the groups of claims are not linked by a common or corresponding special technical feature and define three different inventions not linked by a single general inventive concept,

1.2 Moreover, the inventions are covered by the claims as follows :

Claims 1-5 (partially); 6-15; 23-30

A process, and its associated electrolytic plant, for electrodepositing copper from an electrolyte solution, in which the electrodes have a horizontal hanger bar with a first end and a second end and at the edge of the electrolyte tank two contact bars are provided, with each connected to a power source, the first end of the hanger bar of the cathode resting on one of the two contact bars via a two-line contact and the first end of the hanger bar of the anode resting on the other one of the two contact bars via a two-line contact.

The special technical feature of this group is the two-line contact between the hanger bar of the electrodes and their respective contact bar. This contact provides a large amount of current to the electrodes.

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Claims 1-5 (partially); 16-21; 31-33

A process, and its associated electrolytic plant comprising at least one electrolytic cell, for electrodepositing copper from an electrolyte solution, in which in the at least one electrolytic cell a fluid distributor is provided, through which during operation of the electrolysis electrolyte solution, gas bubbles or a mixture of electrolyte solution and gas bubbles are introduced into the electrolytic cell.

The special technical feature of this group is the fluid distributor provided in the electrolytic cell. This allows to increase the mixing of the electrolyte, and thus, to ensure a better uniformity of the deposition on the whole surface of the cathode.

Claims 1-5 (partially); 22

A process, and its associated electrolytic plant, for electrodepositing copper from an electrolyte solution, in which the cathodes have an indentation of V-shaped cross-section at their lower longitudinal edge.

The special technical feature of this group is the V-shaped indentation of the lower longitudinal edge. This decreases the undesired increased deposition at the edge of the cathode, and enables a separation of the front and rear sides deposited on the cathode.

Thus, these three inventions solve three different technical problems.

In conclusion, the groups of claims are not linked by a corresponding special technical feature and define three different inventions.

1.3 The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

Re Item V.

Reference is made to the following documents:

- D1 : DE 199 40 698 A1 (METALLGESELLSCHAFT AG; MG TECHNOLOGIES AG) 8 March 2001 (2001-03-08) GB 1 460 089 A (IMPERIAL METAL INDUSTRIES LTD) 31 December 1976 (1976-12-31)
D2 : US-A-5 679 240 (ANASTASIJEVIC ET AL) 21 October 1997 (1997-10-21)
D3 : US-A-4 098 668 (ANDERSEN ET AL) 4 July 1978 (1978-07-04)
D4 : US-A-5 865 967 (HIAI ET AL) 2 February 1999 (1999-02-02)

2. FIRST INVENTION : Claims 1-5 (partially); 6-15; 23-30

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claims 1, 6 and 23** does not involve an inventive step in the sense of Article 33(3) PCT.

2.1.1 As already explained in point 1.1.1, **claim 1** does not seem to involve an inventive step with regard to D1.

In addition, a process such as described in **claim 6** is already disclosed in D1 (see Fig. 3, 4). Therefore, claim 6 does not involve an inventive step (Art. 33(3) PCT).

2.1.2 The present application does not meet the criteria of Article 33(1) PCT, because

the subject-matter of **claim 23** is not new in the sense of Article 33(2) PCT.

The document D1 discloses (the references in parentheses applying to this document):

An electrolytic device for electrowinning copper from an electrolyte solution (col. 1, l. 5-7) comprising :

An electrolytic cell (a tank (Fig. 1, feature 1), an anode (Fig. 1, feature 5) and a cathode (Fig. 1, feature 4) being alternatively arranged) ;

Two contact bars arranged at the edge of the electrolyte tank, which each are connectable to a power source (Fig. 1, features 6, 7);

Two isolating bars, the contact bars and the isolating bars being fixed on the edge of the tank (Fig. 1, 2, features 1, 6, 7, 16, 17).

The electrodes (anodes and cathodes) each have a horizontal hanger bar (Fig. 2, feature 8). The first end of the hanger bar of each cathode rest on one of the contact bar, and the first end of the hanger bar of each anode rest on the other contact bar (Fig. 1, 2). The first end of the hanger bars each rest on the contact bars via a two-line contact (Fig. 3, 4). The second end of the hanger bars rest on isolating bars (Fig. 2, features 8, 16).

Therefore claim 23 is not new (Art. 33 (2) PCT).

2.2. Dependent **claims 2-5, 7-15, 24-30** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty or inventive step (Article 33(2) and (3) PCT), see D1 and D2 passages cited in the search report.

3. SECOND INVENTION : Claims 1-5 (partially); 16-21; 31-33

3.1. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claims 1, 16 and 31** does not involve an inventive step in the sense of Article 33(3) PCT.

3.1.1. As already explained in point 1.1.1, **claim 1** does not seem to involve an inventive step with regard to D1.

In **claim 16**, the process is further characterized in that a fluid distributor, through which during operation of the electrolysis electrolyte solution is provided in the electrolytic cell, This is not disclosed in D1.

The problem to be solved by the present invention may therefore be regarded as increasing the agitation of the electrolyte in the cell.

The use of a fluid distributor is described in document D3 as providing an improved circulation path of the electrolyte in the cell (see Fig. 3, col. 3, l. 25-30). The skilled person would therefore regard it as a design option to include this feature in the process described in document D1 in order to solve the problem posed.

3.1.2. Moreover, the cell containing the fluid distributor is also disclosed in D3 (Fig. 3, col. 3, l. 25-30), therefore **claim 31** does not seem to involve an inventive step (Art. 33(3) PCT).

3.2. Dependent **claims 2-5, 17-21, 32-33** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Art. 33(3) PCT), see D1 and D3 passages cited in the search report.

4. THIRD INVENTION : Claims 1-5 (partially); 22

4.1. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 1 and 22** does not involve an inventive step in the sense of Article 33(3) PCT.

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As already explained in point 1.1.1, **claim 1** does not seem to involve an inventive step with regard to D1.

In **claim 22**, the process is further characterized in that the cathodes have an indentation of a V-shaped cross section at their lower longitudinal edge.

This is not disclosed in D1.

The problem to be solved by the present invention may therefore be regarded as providing a good separation of the deposited metal from the mother plate.

The solution proposed in claim 22 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

A cathode plate provided with a V-shaped cross-section at its lower edge is described in document D4 as providing the same advantages as in the present application (see Fig. 1, col. 3, l. 9-20). The skilled person would therefore regard it as a normal design to include this feature in the process described in document D1 in order to solve the problem posed.

4.2 Dependent **claims 2-5** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Art. 33(3) PCT), see D1 passages cited in the search report.

Re Item VIII.

5. The application does not meet the requirements of Article 6 PCT, because **claims 1, 3, 11 and 23** are not clear.

5.1 The statement "two electrodes serving as anode and cathode" used in **claim 1** is unclear and leaves to the reader two possible understandings of the exact arrangement of the electrodes (either each electrode serves both as anode and cathode, or one electrode serves

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as an anode, and the second electrode serves as a cathode) rendering the definition of the subject-matter of said claim unclear, Article 6 PCT.

5.2 In **claim 3**, the cross-sectional area should be expressed in square meters, rather than in meters.

First invention : Claims 1-5 (partially); 16-21; 31-33

5.3 In **claims 11 and 23**, it is referred to the "intermediate contact bars", which are not mentioned in the preceding claims, leaving the reader in doubt as to the technical feature to which they refer.